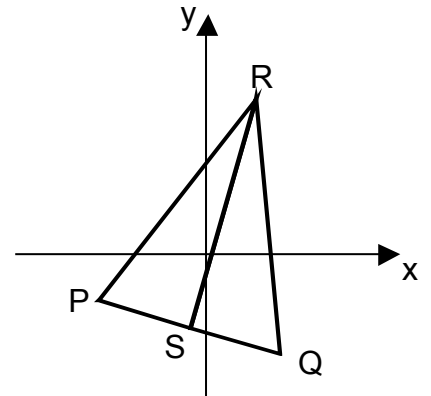


Higher Maths Supported Study – 3

1. Find the equation of the line passing through (4,-4) parallel to the line AB where A is (-6,2) and B is (2,-10).

2. Triangle PQR has vertices P(-6,-3), Q(2,-7) and R(5,9).

- (a) Find the equation of the median RS.
(b) Show that this median is perpendicular to the line PQ.
(c) What type of triangle is PQR?



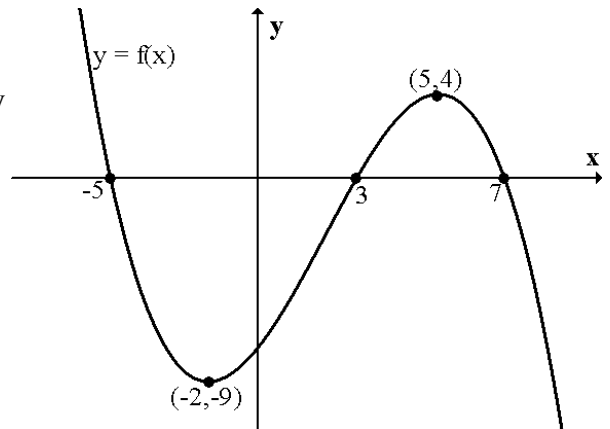
3. The functions f and g, defined on suitable domains, are given as

$$f(x) = \frac{1}{2}(2 + x^2) \quad \text{and} \quad g(x) = k(6x - 3)$$

- (a) Given that $f(4) = g(5)$, find the value of k.
(b) Find an expression for $g(f(x))$.
(c) Find x when $g(f(x)) = 2g(x)$.

4. The diagram opposite shows part of the graph y
On separate diagrams sketch

- (a) $y = f(x - 3)$
(b) $y = 2 - f(x)$
(c) $y = 3f(-x)$



5. Two functions f and g are defined as

$$f(x) = \frac{2x}{x-1} \quad \text{and} \quad g(x) = \frac{6}{x} \quad x \neq 0, 1$$

- (a) Find an expression for $f(g(x))$. Give your answer as a single fraction in its simplest form.
(b) State a suitable domain for $f(g(x))$.

6. Solve the equations for $0 \leq x \leq 360$

(a) $2\sqrt{3} \tan x + 4 = 2$

(b) $2\cos^2 x - 3 = -2$

7. Two functions f and g are defined, on suitable domains, as

$$f(x) = \frac{1}{x^2 + 2} \quad \text{and} \quad g(x) = \sqrt{\frac{1 - 2x}{x}}$$

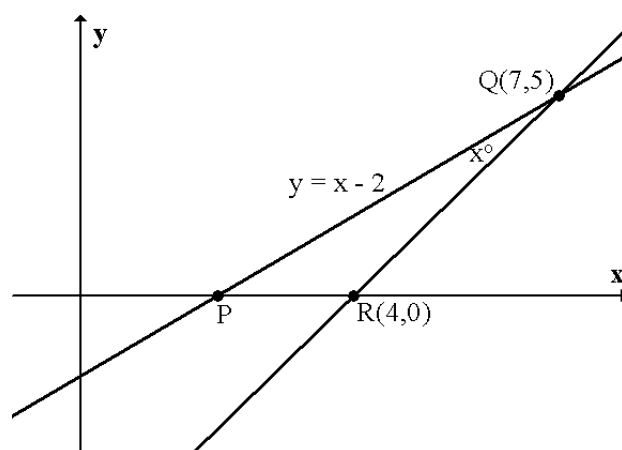
- Find a formula for $f(g(x))$.
- State the connection between the functions f and g .

8. The diagrams shows the line PQ and RQ.

PQ has equation $y = x - 2$.

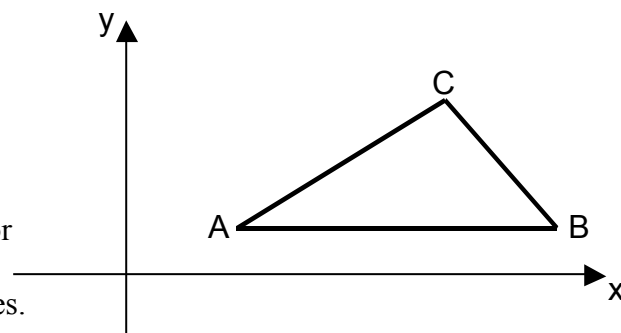
R is the point $(4,0)$ and Q is $(7,5)$.

Calculate the size of angle x° .



9. Triangle ABC has vertices $A(4,2)$, $B(14,2)$ and $C(10,6)$.

- Write down the equation of the perpendicular bisector of AB.
- Find the equation of the perpendicular bisector of AC.
- Find the point of intersection of these two lines.



10. The diagram opposite shows two lines MN and PQ which are perpendicular to each other.

P is the point $(3, 2\sqrt{3})$.

- Find the equation of the line PQ.
- Find the coordinates of Q.

